WHAT IS CLAIMED IS:

1. A body fluid sampling device comprising:
a single cartridge;
a penetrating member coupled to said single cartridge; and
an analyte detecting members.

2. A method of controlling fluid flow, the method comprising:
(a) providing a cartridge configured to slidably hold a plurality of penetrating members and to have a plurality of analyte detecting members; and
(b) using surface texturing on the cartridge to form texturing to direct fluid into a desired area on the cartridge.

3. The method of claim 2 wherein said texturing is formed chemically.

4. The method of claim 2 wherein the surface texturing guides the fluid to one of said analyte detecting members.

5. A body fluid sampling device comprising:
a single cartridge;
a plurality of penetrating members coupled to said single cartridge and operatively couplable to a penetrating member driver, said penetrating members movable to extend radially outward from the cartridge to penetrate tissue;
a plurality of analyte detecting members coupled to said single cartridge, wherein at least one of said analyte detecting members positioned on the cartridge to receive body fluid from a wound in the tissue created by the penetrating member when the cartridge is in an operative position; and
a texture structure on said cartridge positioned to guide fluid generated by said tissue towards one of the analyte detecting members.

6. A body fluid sampling device comprising:
a single cartridge;

a plurality of penetrating members coupled to said single cartridge and operatively couplable to the penetrating member driver, said penetrating members movable to extend radially outward from the cartridge to penetrate tissue;

a plurality of analyte detecting members coupled to said single cartridge, wherein at least one of said analyte detecting members positioned on the cartridge to receive body fluid from a wound in the tissue created by the penetrating member when the cartridge is in an operative position; and

a plurality of mesh structures positioned to draw fluid generated by said tissue towards one of the analyte detecting members.

7. The device of claim 6 further comprising a ring around the cartridge wherein said analyte detecting members are mounted on said ring, along with said mesh.

8. The device of claim 6 further comprising a ring around the cartridge wherein said analyte detecting members are coupled to said cartridge through said ring.

9. The device of claim 6 further comprising a plurality of electrodes coupled to said analyte detecting member.

10. The device of claim 6 wherein the mesh is a gradient mesh.

11. A body fluid sampling device comprising:

a support structure;

a sensory material on a first side of said support structure;

a conductor material coupled to the sensory material; and

a commutator positioned to engage said conductor material to obtain analyte measurments.

12. The device of claim 11 further comprising a radial cartridge, said support structure coupled to said radial cartridge.

13. The device of claim 11 further comprising a plurality of electrodes each having said sensory material.

14. A penetrating member actuator comprising:

a support structure;

a first electrode;

a second electrode;

an elastomeric material between said electrodes, wherein said material elongates upon activation of the electrodes, causing a penetrating member to move.

15. The device of claim 14 further comprising a radial cartridge, said material having a gripper positioned to engage penetrating members on said radial cartridge.

16. The device of claim 14 further comprising a coupler in contact with the material for coupling the penetrating member to the material.

17. A method for designing an analyte detecting member, the method comprising:

(a) mathematically replicating the significant physical and chemical processes taking place in the analyte detecting member and sample; and

(b) dividing assay time into small time steps and the analyte detecting member into small control volumes, wherein during each time step (and in each control volume), the model simultaneously solves a specie conservation equation for each important constituent: oxygen, glucose, glucose oxidase, catalase, and hydrogen peroxide.

18. The method of claim 17 wherein each conservation equation includes an accumulation term, a diffusion term, and a production/destruction term wherein the latter relies on a production rate calculated either as a Michaelis-Menton reaction (catalase) or Ping-Pong Bi-Bi reaction (glucose oxidase).

19. The method of claim 17 wherein tracking the diffusion of each important chemical component of the emulsion and sample, the chemical reactions between them, and the resulting signal from oxygen depletion.

20. The method of claim 17 wherein treating the emulsion as a continuum with properties based on volume-fraction averages of the properties of the hydrophobic and hydrophilic phases.